CMI250

User Manual

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INTRODUCTION

PURPOSE OF EQUIPMENT

The CMI250 is a non-destructive thickness tester. It is designed to precisely measure nonconductive coatings on conductive substrates and nonmagnetic coatings on magnetic substrates.

ELECTRICAL SUPPLY

Each CMI250 operates on two AA alkaline batteries. The batteries should be replaced when the battery symbol in the display is not shaded.

COMMUNICATIONS OPTION

A USB connector is provided on each gauge for connection to a PC. To upload data to a PC, the Communications Option must be installed. The Communications Option package contains a USB cable, and a CD with USB drivers, communications software and installation instructions.

LOCATION OF EQUIPMENT

The CMI250 is a hand-held thickness gauge designed to be used in a shop environment. As with any high sensitivity electronic device, avoid areas where high RF fields may be present.

GETTING STARTED

UNPACKING

Carefully open the shipping carton and remove all items. Notify Oxford Instruments and/or the carrier immediately in case of any damage to the unit.

POWER UP

Place the gauge on a surface or press any button.

MEASURING

Place the gauge on a surface and the measured thickness will be displayed. Press the left button to return to the menu.

OPERATOR KEYSTROKES

All paths, e.g. Settings/Display/Backlight/Yes or No, start from the Main menu. Refer to ILL 1 for a map of the menu structure.

TURN ON

Press any button or place gauge on a surface.

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TURN OFF

Press and hold the center button.

TURN BACKLIGHT ON/OFF

Press and hold the Left button or select Settings/Display/Backlight/Yes or No.

SELECT MENU ITEM

Scroll to the item by pressing the Up and Down buttons and press the Center or Right buttons to select the item.

GO BACK TO PREVIOUS MENU

Press the Left button.

CHANGE UNITS

Select Settings/Measure/Parameters/Units/mil, or um.

CHANGE MEMORY LOCATION

Select Memory/Location. Enter a number (1 to 99) by pressing the Up/Down buttons to increment/decrement a digit, and the Right/Left buttons to go to the next/previous digit. Press the Right button from the right-most position to complete the entry.

VIEW STATISTICS

Select Stats/View. Press the Up and Down buttons to scroll through the list and the Left button to return to the menu.

CLEAR STATISTICS

Select Stats/Clear/Clear Stats.

CLEAR LAST READING FROM STATISTICS

Press and hold the Down button after taking a measurement.

DISPLAY LAST READING FROM MENU

Select Measure from the Main menu.

UPLOAD STATISTICS OR READINGS TO PC

Select Stats/Export/Stats, Data, Histogram or All; or select Stats/Upload Rdgs. Requires that the Communications Option be installed.

REZERO ON SUBSTRATE

With gage at least 4 inches from the substrate or any conductive or magnetic material, press and hold Right button or select Calibrate/Base Only.

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INVERT DISPLAY

When measuring the underside of surfaces (i.e. probe end of gage pointing upward), the display may be inverted by pressing and holding the Top button. Repeat to return to normal operation (i.e. probe pointing downwards).

MENU DESCRIPTION

Refer to ILL 1 for memory layout and structure

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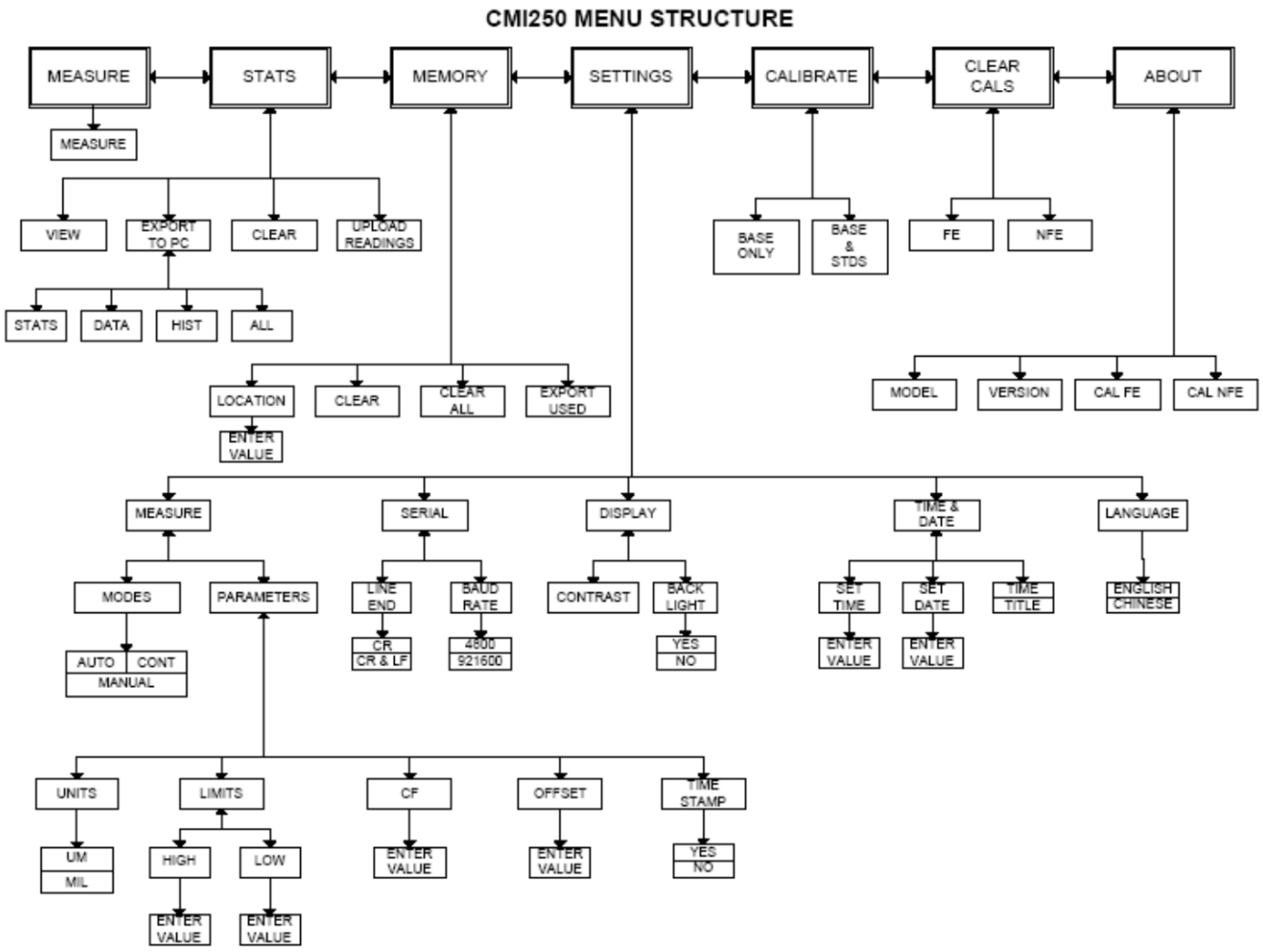
MENU STRUCTURE - ILL 1



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MAIN MENU

Measure, Stats, Memory, Settings, Calibrate, Clear Cal, and About.

MEASURE

- Advances to measure screen.
- Last measurement taken is shown.
- Memory location is shown in the upper left corner.
- Measurement type shown in lower left corner. Fe for nonconductive coatings on conductive substrates or NFe for nonmagnetic coatings on magnetic substrates.
- Units are shown in the lower right corner.

STATS

View, Export, Clear and Upload Rdgs. All displayed quantities are referenced to the current memory location.

VIEW

Displays the following quantities:

Total: The total number of readings.
High: The highest reading.
Low: The lowest reading.
Range: The difference between the high and low readings.
Mean: The mean.
SDEV: The standard deviation.
%SDev: The percent standard deviation.
Accur: Accuracy.
CPK: A statistical quantity based on set user limits. Therefore, it only appears if the user sets limits.

EXPORT

Exports these quantities to a personal computer (PC).

Stats: Total, high, low, range, mean, sdev, %sdev, accur, and CPK.
Data: Readings. If Timestamp is Yes, (see Settings/Measure/Parameters/Timestamp below) date and time of each reading is included.
Histogram: Statistical graph.
All: Stats, data, and histogram.

CLEAR

Cancel: Returns to the Stats menu.
Clear Stats: Clears all statistical quantities and readings from the current memory location. The memory location remains active and ready to store future readings.

UPLOAD READINGS:

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Transfers readings to a PC, all text excluded.

MEMORY

Location, Clear, Clear All, Export Used.

LOCATION

Allows user to enter value from 1 to 99 by pressing the Up and Down buttons to increment/decrement a digit and the Right and Left buttons to go to the next/previous digit. When at the farthest right position, press Right button to complete the entry.

CLEAR

Cancel: Returns to the Memory menu.

Clear: Clears all statistics and stored readings from the current memory location and deactivates that location. Deactivation means that no memory is currently allocated to store readings. If the user enters the location value again, then memory will be allocated and the channel reactivated.

CLEAR ALL

Cancel: Returns to the Memory menu.

Clear All: Clears all memory locations and deactivates them and then reactivates location 1. An active memory location means memory has been allocated for it to store readings.

EXPORT USED

Transfers all active memory locations to a PC.

SETTINGS

Measure, Serial, Display, Time & Date, and Lang.

MEASURE

These are referenced to the current memory location.

MODES: Auto, Cont, Manual.

AUTO: Measured reading is displayed and stored automatically when the user places the gage on surface. The user must lift the gage off the surface before placing it down again in order to take the next reading.

CONT: Measured readings are continuously displayed but not stored when the user places the gage on surface.

MANUAL: Similar to the continuous mode in that measured readings are continuously displayed when the user places the gage on surface. However, whenever the user presses the Center button the last reading is stored and therefore included in the statistics.

PARAMETERS: Units, Limits, CF, Offset, Time Stamp.

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UNITS: Toggles units between mils (1/1000 inch) or um (micrometers or microns).
LIMITS: Allows user to enter limits from 0 to 80 mils.
CF: Used when readings differ from a known value. CF = desired reading/ actual reading. 0.5 to 4 are allowable entries.
OFFSET: Subtracted from the reading. -80 mils to +80 mils are allowable entries.
TIMESTAMP: Toggles between Yes and No. Yes means that Stats/Export/Data will include the time and date of each reading.

SERIAL

Specify serial parameters for data transfer to a PC.

LINE END: **Toggles between CR and CR-LF. CR means a carriage return will be included at the end of each line to be transferred. CR-LF means a carriage return and line feed will be included at the end of each line.**

BAUD RATE: **Toggles between transfer rates of 4800 bytes per second or 921600 bytes per second.**

DISPLAY

CONTRAST: **Press the Up and Down buttons to adjust the display contrast.**
BACKLIGHT: **Toggles the backlight on/off.**

TIME & DATE

SET TIME: **Allows entry of time in an AM/PM format.**
SET DATE: **Allows entry of date in an yy/mm/dd format.**
TIME TITLE: **If Yes, time is displayed in the menu title after 2 secs from the last button press.**

LANG

Select either English or Chinese for the language used.

CALIBRATE

BASE ONLY

- Choose this option with gage at least 4 inches from the substrate or any conductive or magnetic material.
- When gage beeps and displays Base in lower left corner, place gage on substrate to be calibrated (zeroed) on.
- When gage displays Done in lower left corner it may be lifted off of substrate.

BASE/STDS

- Calibrate on substrate and then 2 standards (shims or plated).
- Follow the same procedure as for option BASE ONLY above for calibrating (zeroing) on substrate.

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- Calibrate on 2 standards (shims or plated).
- The thinnest standard is Std 1 and the thickest is Std 2.
- Press the Center Button to advance to the Calibration screen and place the gage on Std 1.
- When continuous readings stabilize press the Center button to accept, then lift gage and enter value of standard.
- Then place gage on Std 2 and repeat.
- After entering the value for Std 2 the gage will display Done if the calibration was successful.
-

CLEAR CAL

FE

- **CANCEL**: Returns to the Clear Cal menu without clearing.
- **CLEAR CAL**: Clears the user calibration for Fe measurement type (Base Only or Base/Stds).

NFE

- **CANCEL**: Returns to the Clear Cal menu without clearing.
- **CLEAR CAL**: Clears the user calibration for NFe measurement type (Base Only or Base/Stds).

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ABOUT

MODEL

CMI250 is the model of the gage.

VERSION

Displays the current software version.

CAL FE

Displays Usr Bse or Usr Stds if user has calibrated using Base Only or Base/Stds respectively for the Fe measurement type, otherwise displays Factory.

CAL NFE

Displays Usr Bse or Usr Stds if user has calibrated using Base Only or Base/Stds respectively for the NFe measurement type, otherwise displays Factory.

SPECIFICATIONS

MATERIALS	CALIBRATION
CMI250 Gauge	Factory Calibrated
OICM Certified Steel, 1 mil and 10 mil shim	Factory Certified

MEMORY STRUCTURE

- Locations 01 to 99 available
- Current location shown in the upper left of display
- Stores readings and corresponding statistics, Conductivity Factor (CF) and Offset parameters.

MEASUREMENT TYPE

- Fe: 39 µin/1 µm – 80 mil/2032 µm
- NFe: 39 µin/1 µm – 60 mil/1524 µm

CONDUCTIVITY FACTOR (CF)

- Used when readings differ from known value
- CF=Desired reading/Actual Reading
- Range is 0.5 to 4

OFFSET

- Subtracted from reading
- Range is from -80 mils to +80 mils.

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OPERATING MODES

MODE	MENU SETTING	MEASUREMENT
Auto	Auto	Last reading passed to statistics
Continuous	Cont	None taken
Manual	Manual	Last reading passed to statistics when Center button is pressed

LOW BATTERY

- Indicated when battery symbol is not shaded
- Replace batteries with two AA types

SAMPLE FOR MEASUREMENT

- Must be clean and free of surface defects

COMMUNICATIONS OPTION

- The communications option allows exporting data from the CMI250 to a PC via the USB connector on the gauge.
- The package contains a USB cable, and a CD with software programs, USB drivers and installation instructions.
- Place the CD into a drive on a PC and follow the instructions in the Readme.doc file in the Oxford CMI165 folder.

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